

Docket No.: 511582001620  
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Daniel E. AFAR

Application No.: 09/455,486

Filed: December 6, 1999

For: NOVEL SERPENTINE TRANSMEMBRANE  
ANTIGENS EXPRESSED IN HUMAN  
CANCERS AND USES THEREOF

Art Unit: 1642

Examiner: Gary B. Nickol, Ph. D.

**TOPICS FOR INTERVIEW**

Applicants appreciate the willingness of the Office to interview this case, which concerns STEAP-2 protein.

The sole outstanding issue, applicants believe, is whether the invention as claimed is useful under 35 U.S.C. § 101. Applicants wish to clarify that the rejection under 35 U.S.C. § 112, First Paragraph, is not based on any lack of enablement in preparing the claimed isolated STEAP-2 protein or using the protein to produce an immunological response, which response would include the formation of antibodies. The sole question is whether there is any practical utility for the antibodies to produced and therefore whether the claimed protein and methods are useful.

There is no question that the specification as filed describes utilities for the STEAP-2 protein. For example, page 24, lines 30-35, states that determining the status of STEAP expression patterns may be used to diagnose cancer and provide prognostic information useful in defining

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appropriate therapeutic options. Further, page 27, lines 9-11, states that the cell surface nature and expression profiles of the STEAP's in cancers, including prostate cancer, indicate that they are promising targets for antibody therapy of prostate and other cancers expressing STEAP's. Page 28 states that STEAP antibodies may be introduced into a patient such that the antibody binds to STEAP on the cancer cells and mediates the destruction of the cells and the tumor and/or inhibits growth of the cells of the tumor. The application cites other instances where antibodies have been used to treat cancer on page 28, lines 21-29.

In any event, it would be apparent to the skilled practitioner that antibodies of this type would be useful candidates for cancer diagnosis and therapy in the event that STEAP-2 protein is actually expressed on the surface of the cancer cells.

As applicants understand the outstanding rejections, the points of disagreement are two-fold:

With what degree of specificity does the target cancer need to be identified; and

With what degree of certainty must applicants establish that the STEAP-2 protein is expressed at the surface of the identified cancers?

As is customary in the industry, gene expression corresponding to the STEAP-2 protein was determined by analyzing for mRNA and these results are set forth in the specification in Figures 14-16. These figures clearly show that at the mRNA level, at least, the only normal tissue which shows expression at all is prostate and some, but not all, prostate cancer xenographs express this gene and that some, but not all, pancreatic, colon, testicular and ovarian cancer cell lines express it.

To the extent that mRNA's expression is indicative of the formation of protein, it would be apparent to the skilled practitioner that antibodies to the STEAP-2 protein would be useful to

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identify those prostate, pancreatic, colon and ovarian cancers that do express STEAP-2 and to use such antibodies therapeutically against those cancers thus identified in a manner analogous to Herceptin<sup>®</sup> treatment now approved for breast cancer. It should be understood that the expression of STEAP-2 in normal prostate does not undermine the utility of the antibodies raised in therapy since prostate is a dispensable organ; Rituxan<sup>®</sup> destroys all B cells, but they come back.

The Examiner correctly states that mRNA expression is not inevitably bound to protein expression. Applicants' position is that this is the exception to the rule and that inevitability need not be shown. Applicants based this understanding of the law on the holding in *In re Brana*, 34 USPQ2d 1436 (Fed. Cir. 1995) which recognizes that a claimed compound for treating cancer may not ultimately be useful in that regard, but that taking the initial screening steps successfully is sufficient to establish the required patentable utility. Applicants believe that mRNA production is sufficient to raise the level of probability of protein production to that required for patentable usefulness.

Nevertheless, applicants have undertaken to demonstrate that the production of STEAP-2 protein in particular from its mRNA is a case that does not fall within the exception to the rule. Initially, as the Examiner has acknowledged, applicants have provided evidence in the form of declarations to show that mRNA is translated into protein in PC-3, a cancer cell line, and that STEAP-2 alters the drug resistance of these cells. Further, in the latest submitted declaration, it is shown that the protein is present in prostate and lung cancer patient specimens. Applicants wish to discuss at the interview whether:

1. Evidence of mRNA expression alone is sufficient to show patentable utility; and

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2. If not, whether the declaratory evidence of record is sufficient to elevate the probability of protein expression in cancers so as to confer patentable utility on the basis set forth above.

We also wish to point out that a perspective licensee is predicated the terms of the license on the issuance of a patent covering the *protein*. Applicants respectfully submit that this commercial interest in protecting the protein on the part of a licensee is itself evidence that those of skill in the art consider the protein to be useful.

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Respectfully submitted,

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